IN THE CLAIMS

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A ~~scrambling~~communication system in multicarrier code division multiple access (MC-~~DCMA~~CDMA), comprising:

a transmitter for receiving a ~~user's~~ bit stream of at least one user having an orthogonal code combination, using a fixed scrambling code which is predetermined according to the user's orthogonal code combination or ~~a~~the number of users, generating multicarrier signals, and outputting ~~them~~the multicarrier signals; and

a receiver for using a scrambling code matched with the scrambling code used by the transmitter, and receiving the multicarrier signals from the transmitter.

2. (Currently Amended) The ~~scrambling~~communication system of claim 1, wherein the scrambling code multiplied to each subcarrier by the transmitter uses a predetermined pattern established according to the user's orthogonal code combination and it is fixed while the identical user's orthogonal code combination is maintained.

3. (Currently Amended) The ~~scrambling~~communication system of claim 1, wherein the transmitter comprises:

a symbol modulator for receiving ~~a~~the bit stream of ~~a k th~~the at least one user, and modulating the same according to a modulation method determined by the system;

a multiplier for multiplying respective modulation symbols ~~modulated~~generated by the symbol modulator by an orthogonal code C_k having an N chip length, and spreading them into chip sequences;

an adder for adding the ~~users'~~ chip sequences spread by the multiplier in synchronization with symbol timing;

an interleaver for interleaving the chip sequences of M symbols added by the adder and arranging the chips belonging to an identical symbol by an M chip interval;

a serial/parallel converter for converting the chip sequences of the symbols arranged by the interleaver into parallel chip signals with a size identical to the number of subcarriers;

a scrambling chip vector generator for providing scrambling codes having a length identical with the number of subcarriers to the parallel chip signals of the serial/parallel converter, ~~and~~ multiplying them chip by chip and outputting scrambled chip signals;

an inverse fast Fourier transformer (IFFT) for performing inverse fast Fourier transform for the scrambled chip signals; and

a signal generator for generating baseband multicarrier signals from the outputs of the IFFT.

4. (Currently Amended) The ~~scrambling~~communication system of claim 3, wherein the scrambling chip vector generator includes a multiplier for multiplying the parallel chip signals of the serial/parallel converter by the scrambling codes.

5. (Currently Amended) The ~~scrambling~~communication system of claim 3, wherein the signal generator comprises:

a parallel/serial converter for converting the parallel chip signals converted by the IFFT into serial chip signals; and

a guard time inserter for inserting guard time into the serial chip signal converted by the parallel/serial converter.

6. (Currently Amended) The ~~scrambling~~communication system of claim 1, wherein the scrambling code satisfies a condition for minimizing ~~the~~a ~~PAPR~~peak-to-average power ratio performance measure(PAPR), and peak-to-average power ratio ~~PAPRo~~ ($PAPR_0$) which is defined according to the ~~subsequent~~ equation:

$$\Pr\left\{\frac{\max_{0\le t<T_s}|y(t)|^2}{E(|y(t)|^2)} > PAPR_0\right\} = P_0$$

where y(t) is an output signal of the transmitter, T_s is a symbol period, and Po is an~~the~~ output signal clipping probability which is specified according to a~~the~~ system requirement.

7. (Currently Amended) The ~~scrambling~~communicatoin system of claim 1, wherein the transmitter finds a fixed scrambling pattern for maintaining ~~the~~its ~~PAPR~~peak-to-average power ratio to be a minimum value for ~~the~~ a current user's orthogonal code combinations, and uses the scrambling code while the current user's orthogonal code combination is maintained.

8. (Currently Amended) The ~~scrambling~~communication system of claim 7, wherein the fixed scrambling pattern is selected as a single scrambling pattern that has a value close to the peak-to-average power ratio~~PAPR~~ caused by ~~the~~ scrambling patterns which are optimized at each code combination over all code combinations before operating the system.

9. (Cancelled)

10. (Currently Amended) The ~~scrambling~~communication method of claim ~~9~~17, wherein the scrambling code multiplied to each subcarrier ~~in (a 3)~~ by said converting uses a predetermined pattern established according to a current user's orthogonal code combination ~~and~~ ~~it~~which is fixed while the ~~identical~~ current user's orthogonal code combination is maintained.

11. (cancelled)

12. (Currently Amended) The ~~scrambling~~communication method of claim ~~11~~17, wherein the generation of the multicarrier signals ~~in (a-3)~~ by said converting comprises multiplying the scrambling codes by the parallel chip signals input for inverse fast Fourier transform for each chip.

13. (Currently Amended) The ~~scrambling~~communication method of claim ~~9~~17, wherein the scrambling code satisfies a condition for minimizing ~~the~~a ~~PAPR~~peak-to-average power ratio performance measure (PAPR), and peak-to-average power ratio ~~PAPRo~~ ($PAPR_0$) which is defined according to the ~~subsequent~~ equation:

$$\Pr\left\{\frac{\max_{0\le t<T_s}|y(t)|^2}{E(|y(t)|^2)} > PAPR_0\right\} = P_0$$

where y(t) is an output signal of the transmitter, T_s is a symbol, and ~~Po~~ P_0 is ~~the~~an output signal clipping probability which is specified according to ~~the~~a system requirement.

14. (Currently Amended) The ~~scrambling~~communication method of claim ~~9~~17, wherein the transmitter finds a fixed scrambling pattern for maintaining ~~the~~its ~~PAPR~~peak-to-average power ratio to be a minimum value for the at least one user's orthogonal code combinations, and uses the scrambling code while the at least one user's orthogonal code combination is maintained.

15. (Currently Amended) The ~~scrambling~~communication method of claim 14, wherein the fixed scrambling pattern is selected as a single scrambling pattern that has a value close to the ~~PAPR~~peak-to-average power ratio caused by the scrambling patterns which are respectively optimized at each code combination over all code combinations before operating the system.

16. (Currently Amended) A recording medium storing a program having instructions for causing a computer to execute a method comprising:

(a) modulating a bit streams of at least one user having an orthogonal code combination into modulation symbols~~a k-th user~~ into modulation symbols, multiplying the respective modulation symbols by an orthogonal code C_k, and spreading them into chip sequences;

(b) adding the ~~users' chip~~ sequences spread in (a) in synchronization with symbol timing, interleaving the chip sequences of M symbols that will be transmitted in parallel, and arranging the ~~chips~~chip sequences belonging to an identical symbol by an M chip interval; and

(c) converting the chip sequences arranged in (b) into parallel chip sequence signals, multiplying the parallel chip signals by ~~the scrambling code~~ a fixed scrambling code which is predetermined according to the at least one user's orthogonal code combination, modulating each chip for each subcarrier through inverse fast Fourier transform, and generating and outputting multicarrier signals.

17. (New) A communication method in multicarrier code division multiple access (MC-CDMA), comprising:

(a-1) modulating a bit stream of at least one user having an orthogonal code combination into modulation symbols, multiplying the respective modulation symbols by an orthogonal code C_k, and spreading them into chip sequences;

(a-2) adding the chip sequences spread by said modulating in synchronization with symbol timing, interleaving the chip sequences of M symbols that will be transmitted in parallel, and arranging the chips belonging to an identical symbol by an M chip interval; and

(a-3) converting the chip sequences arranged by said adding into parallel chip signals having a number of subcarriers, multiplying the parallel chip signals by a fixed scrambling code which is predetermined according to the at least one user's orthogonal code combination, modulating each chip for each subcarrier through inverse fast Fourier transform, and generating and outputting multicarrier signals.